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# LEAD POISONING PREVENTION & TREATMENT UPDATES

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## Welcome

This Newsletter is a collaborative effort between the Virginia Department of Health's Lead-Safe Virginia Program and the University of Virginia's Division of Medical Toxicology. Our goal is to provide you with information obtained from the current research literature and updates on available resources related to lead poisoning prevention. With your help we will strive to reach the goal of eliminating lead as an environmental hazard for children by 2010.

## This issue is a one-time mailing

To continue receiving quarterly issues via email, contact [klw2s@virginia.edu](mailto:klw2s@virginia.edu) or sign up at [www.leadpoison.org](http://www.leadpoison.org). You can also view archived issues at that web address. Past articles include:

- **Sources of Lead Poisoning**
- **Lead Poisoning and Pregnancy**
- **Mexican Candy: a Source of Lead Poisoning**
- **Retained Lead Bullets and Lead Poisoning**

CME-accredited online courses in lead poisoning for health care professionals available at [www.leadpoison.org](http://www.leadpoison.org).

## Phone Numbers to Know

- **Lead-Safe Virginia, Virginia**  
Department of Health (877) 668-7987
- **Lead Emergency Hotline** for health care providers: 24-hour expert medical consult (866) SOS-LEAD



## The Medical Literature on Childhood Lead Poisoning

**Markowitz ME, Sinnett M, Rosen JF: A Randomized Trial of Calcium Supplementation for Childhood Lead Poisoning. Pediatrics 2004, 113:e34-e39.**

This study was a randomized, double-blinded, placebo-controlled study of the role of calcium supplementation in treating lead toxicity. The rationale for this was the previously documented inverse relationship between blood lead levels and calcium intake. Animal data have suggested calcium-deficient diets may lead to worsening lead toxicity. It is thought that calcium and lead absorption occur through the same intestinal transport system and may compete for absorption. The objective of this study was to investigate whether or not increasing calcium intake might decrease blood lead levels. The final clinical study consisted of 67 children aged 1-6 years (mean 3.6 years) at lead levels of 10-44 µg/dL. Patients were given either placebo or enough calcium supplementation to achieve 1800mg/day (divided and given TID; adjusted according to biweekly evaluation of diet). The patients received these for 3 months. Venous blood lead levels were taken at enrollment, at end of a 3-month trial, and at 6 months (3 months after end of trial). Home visits were also performed to evaluate for presence of lead and to observe the hand-to-mouth behavior of the child. Dust samples were also collected. Compliance was monitored through questionnaire and measurement of remaining liquid at periodic visits. The results were not encouraging as the mean change in blood lead levels between the two groups of children was comparable at both 3 months and 6 months of follow-up. In conclusion, calcium supplementation in lead poisoned children does not increase the decline in serum lead levels.

**Walter RJ, Dietrich KN, Ware JH: The Effect of Chelation Therapy With Succimer on Neuropsychological Development in Children Exposed to Lead. NEJM 2001, 344:1421-1426.**

The role that lead plays as a detriment in children's neurodevelopment is well described. This study was an attempt to evaluate whether using succimer to chelate children with blood lead levels between 20 to 44 µg/dL (below that recommended for such intervention by the CDC) was an effective intervention to reduce cognitive impairment. The

## NEWS UPDATES

- Recently, children newly arrived in Virginia from Africa were identified with elevated blood lead levels. **Refugee and immigrant children are at risk for lead poisoning** from a combination of factors: their poor nutritional status; caregivers' lack of knowledge about lead paint, soil and dust hazards; and adherence to ethnic folk practices (such as eating off the floor) or use of native products (such as certain folk remedies, food additives, or unsafe dishes) that contain high lead levels. In March 2003 the CDC's Advisory Committee on Childhood Lead Poisoning Prevention issued a statement noting the importance of screening all immigrant and refugee children for lead.
- Many pieces of toy or **costume jewelry and other trinkets** have been recalled recently by the Consumer Product Safety Commission for the risk of lead poisoning they present to children. The items include a Stravina® brand zipper pull, certain pieces of American Girl® jewelry, and a heart-shaped charm bracelet that came packaged with a certain Reebok® athletic shoe model. The charm bracelet was associated with a Minnesota child's death in March of 2006. For more detailed information including model numbers and photos of recalled items: [www.cpsc.gov](http://www.cpsc.gov)

## MORE ONLINE RESOURCES

CDC Spotlights on Lead  
<http://www.cdc.gov/nceh/lead/>

U. S. Consumer Product Safety Commission  
[www.cpsc.gov](http://www.cpsc.gov)

EPA Lead Page  
[www.epa.gov/opptintr/lead/index.html](http://www.epa.gov/opptintr/lead/index.html)

HUD Office of Lead Hazard Control  
[www.hud.gov/offices/lead](http://www.hud.gov/offices/lead)

National Lead Information Center  
<http://www.nsc.org/ehc/lead.htm>

National Center for Lead Safe Housing  
<http://www.cehn.org/cehn/resourceguide/nclsh.html>

CME-accredited online courses in lead poisoning  
[www.leadpoison.org](http://www.leadpoison.org)

Virginia Department of Health, Lead-Safe Virginia Program  
<http://www.vahealth.org/leadsafe/>

investigators enrolled 780 children with blood lead levels in this range (children were 12-33 months old). They were enrolled in a randomized, double-blinded, placebo-controlled study with children given either succimer (up to three 26-day courses of therapy) or encapsulated placebo. The vast majority of residences enrolled received thorough cleaning, paint stabilization and minor repairs at time of randomization. Venous blood samples were taken periodically and cognitive, motor, behavioral, and neuropsychological testing were done over a period of 36 months. Parents' reports revealed 90% of drug doses were given (76% given by pill count). Placebo vs. succimer course interruption was roughly the same (27% vs. 30%). Repeat medicine courses were given if the blood lead level reached 15 µg/dL or higher two weeks after completion of the first or second course. Succimer induced an initial mean drop of 11 µg/dL followed by a rebound in lead levels after that first week. Repeat courses induced the exact same pattern. The placebo group showed steadily decreasing blood lead levels. By one year after treatment, there was very little difference in the blood lead levels in either group. At 36 months the mean IQ of the succimer group was 1 point lower than that of children given placebo. Parents rated the behavior of those on succimer as slightly worse than those in placebo group. All differences were very small. The conclusion was that chelation was not indicated for children within the range of 20 to 44 µg/dL.

**Lidsky TI, Schneider JS. Lead neurotoxicity in children: basic mechanisms and clinical correlates. Brain. 2003 Jan; 126(Pt 1): 5-19.**

This review discusses the current state of knowledge concerning the effects of lead on the cognitive development of children. Addressed are the reasons for the child's exquisite sensitivity, the behavioral effects of lead, how these effects are best measured, and the long-term outlook for the poisoned child. Of particular importance is the accumulating data suggesting that there are toxicological effects with behavioral concomitants at exceedingly low levels of exposure. In addition, there is also evidence that certain genetic and environmental factors can increase the detrimental effects of lead on neural development, thereby rendering certain children more vulnerable to lead neurotoxicity.

**Klitzman S, et. al. Lead poisoning among pregnant women in New York City: risk factors and screening practices. J Urban Health. 2002 Jun;79(2):225-37.**

This article presents information on pregnant women with incident blood lead levels (BLLs) of 20 µg/dL or greater as reported to the New York City Department of Health between September 1996 and June 1999 (n = 33). The BLLs were inversely associated with maternal age and length of time in the United States and directly associated with gestational age and pica behavior. This data suggests that universal screening may increase case finding among high-risk, immigrant populations.

# Guidelines for Childhood Lead Poisoning Screening in Virginia

## SCREENING/RISK FACTOR QUESTIONS

Blood lead levels shall be obtained in children at ages 1 and 2 if they meet ANY one of the criteria noted in the box below. In addition, children ages 3-5 years of age who have not previously been tested and meet ANY one of the criteria in the box below shall also be tested.

1.	Eligible for or receiving Medicaid, or WIC benefits?
2.	Living in a ZIP code determined to be high risk based on age of housing and other factors? (see attached High –Risk ZIP Code list)
3.	Living in or regularly visiting a house or day care center built before 1950?
4.	Living in or regularly visiting a house built before 1978 with peeling or chipping paint or recent (within the last 6 months), ongoing or planned renovation?
5.	Living with or regularly visiting a sibling, housemate or playmate with lead poisoning?
6.	Living with an adult whose job or hobby involves exposure to lead?
7.	Living near an active lead smelter, battery recycling plant, or other industry likely to release lead?

- Take careful history regarding possible lead exposure at each routine visit.
- A child must be tested if the parent or guardian requests testing due to possible exposure.
- Provide nutrition and risk reduction educational materials for parents (see 2002 CDC Case Management Manual available on the CDC or the VDH Lead-Safe Virginia Web pages).
- Screening may be performed by venipuncture or capillary. Filter paper methods are also acceptable. The use of the hand held testing machines must be approved through the Lead-Safe Virginia Program at 804-864-7694 to assure proper quality assurance and reporting of data.

## CONFIRMATION OF SCREENING RESULTS

If result of capillary screening test (µg/dL) is:	Perform diagnostic test on venous blood <u>within</u> :
10-19	3 months
20-44	1 month - 1 week (The higher the screen, the sooner the diagnostic test should be performed.)
45-59	48 hours
60-69	24 hours
≥70	Immediately as an emergency lab test

- Confirm elevated capillary blood lead levels  $\geq 10$  µg/dL.
- A second capillary is allowable if performed within 12 weeks. A venous sample is considered “confirmed”.
- Virginia regulations require reporting of blood lead levels  $\geq 10$  µg/dL (using the EPI-1 form) to the Office of Epidemiology. Regulations effective July 1, 2001 require laboratories to report all blood lead tests on children under the age of six within ten days of analysis.



## **MANAGEMENT OF CHILDREN WITH CONFIRMED ELEVATED BLOOD LEAD LEVELS**

BLOOD LEAD LEVEL ( $\mu\text{g/dL}$ )	ACTION (Case manager assures coordinated action and follow-up)
10-14	<ul style="list-style-type: none"> <li>• *Lead education: Dietary and Environmental</li> <li>• Follow-up blood lead monitoring</li> <li>• Refer for WIC and social services, if needed</li> </ul>
15-19	<ul style="list-style-type: none"> <li>• *Lead education: Dietary and Environmental</li> <li>• Follow-up blood lead monitoring</li> <li>• Refer for WIC and social services, if needed.</li> <li>• Proceed according to actions for 20-40 <math>\mu\text{g/dL}</math> if: A follow-up blood lead level is in this range at least three months after initial venous test, <b>or</b> the blood lead levels increase</li> </ul>
20-44	<ul style="list-style-type: none"> <li>• *Lead education: Dietary and Environmental</li> <li>• Follow-up blood lead monitoring</li> <li>• Begin clinical management (complete medical evaluation, including developmental assessment).</li> <li>• Refer for WIC and social services, if needed</li> <li>• Complete history and medical exam.</li> <li>• Lab work to include hemoglobin or hematocrit/iron status</li> <li>• Environmental investigation (call local health department or Lead-Safe Virginia)</li> <li>• Lead hazard reduction</li> <li>• Medical and developmental monitoring</li> </ul>
45-69	<ul style="list-style-type: none"> <li>• *Lead education: Dietary and Environmental</li> <li>• Follow-up blood lead monitoring</li> <li>• Within 48 hours, begin clinical management including medical treatment, complete medical evaluation, and developmental assessment. For medical treatment information, contact the local health department or regional treatment center listed below. Chelation therapy.</li> <li>• Environmental investigation (call local health department or Lead-Safe Virginia)</li> <li>• Lead hazard reduction</li> <li>• Refer for WIC and social services, if needed.</li> </ul>
70 and above	<ul style="list-style-type: none"> <li>• Hospitalize child and begin medical treatment (chelation therapy) immediately.</li> <li>• Contact a regional treatment center listed below.</li> <li>• Proceed according to actions for 45-69 <math>\mu\text{g/dL}</math></li> </ul>

\* Provide educational materials.

For questions related to your local area, refer to your local health department.

### **Regional Treatment Centers**

Children's Hospital of the King's Daughters (Norfolk)	(757) 668-7179
Medical College of Virginia (Richmond)	(804) 828-7010
University of Virginia (Charlottesville)	(800) 451-1428
Children's National Medical Center (DC)	(202) 884-5000
Toll Free Emergency	(866) 767-5323

NOTE: Local knowledge can override these guidelines as determined by collaboration between the local health director and the private physician.

Developed by the Virginia Department of Health Statewide Screening Plan Work Group, following CDC Guidelines and Virginia Regulations. Funded by the Centers for Disease Control and Prevention and the Virginia Department of Health.

Copies of the *Guidelines for Childhood Lead Poisoning Screening in Virginia*, may be downloaded at [http://www.vahealth.org/leadsafe/Rev\\_Screening\\_04.pdf](http://www.vahealth.org/leadsafe/Rev_Screening_04.pdf)

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